

# PFAS Levels in Dane Co Surface Waters

Friends of Starkweather Creek\* - February 6, 2025

## Summary

[Toxic PFAS chemicals](#) (a group of over 12,000 poly- and perfluoroalkyl substances) are a [long-standing local contamination issue](#) caused by years of fire training with PFAS-containing foams at the [Dane Co Regional Airport](#) (Airport). Sampling by the [Wisconsin Department of Natural Resources](#) and [WDNR contractors](#) revealed that these PFAS have moved into local surface waters, including Starkweather Creek and the Yahara Lakes downstream (Monona, Waubesa, Kegonsa).

In early 2024, the national Sierra Club offered Friends of Starkweather Creek an opportunity to collect PFAS samples in the Starkweather Creek/Yahara Lakes chain and other sites around Dane Co as part of their program to provide local information and boost awareness of this serious problem. Volunteers sampled 20 sites of surface waters around Dane Co during July-August 2024.

Our results showed levels [below Wisconsin surface water standards](#) for PFOS (8 parts-per-trillion) and PFOA (95 ppt) in Lake Mendota, Starkweather Creek above the Airport and in the East Branch, Nine Springs Creek, Devils Lake, Stewart Lake, Black Earth Creek, Fireman's Park Beach and the Wisconsin River.

**Levels of PFAS in the West Branch of Starkweather Creek immediately below the Airport were extremely elevated above state standards:** (1960 ppt PFOS, 200ppt PFOA). High levels continued downstream in the West Branch ( 323-368ppt PFOS, 25-31 ppt PFOA) and in the combined branches just before they flowed into Lake Monona (148ppt PFOS, 12ppt PFOA).

**PFAS levels were consistently above state standards in Lakes Monona, Waubesa and Kegonsa** for PFOS (9-11ppt) PFOS, but well below standards for PFOA (less than 2ppt).

Sampling at the two Madison Metropolitan Sewage District outfalls on Badfish Creek and Badger Mill Creek and showed levels below state standards (5-7ppt PFOS and 3-5ppt PFOA).

[View complete sampling results and locations here.](#)

Our results indicate that high levels of PFAS chemicals well above state standards are still flowing from the Airport into Starkweather Creek and the downstream Yahara Lakes. We hope that stronger efforts will be made to reduce these PFAS releases as soon as possible.

NOTE – This report ONLY provides a “snapshot” of PFAS levels at the specific times and locations we tested. To gain a better understanding of the complete PFAS situation locally, much more sampling would be required in many more locations and repeated regularly over a long time.

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\* [Friends of Starkweather Creek](#) is a 501(c)3 non-profit organization established in 2002 to work for a healthy urban stream to benefit the community through stewardship, education, and advocacy.

## Background – PFAS and Starkweather Creek

Fire training utilizing Aqueous Film Forming Foam (AFFF) as a fire suppressant for flammable liquid fires occurred in two areas at the Airport between 1953 and 1987. Perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexanesulfonic acid (PFHxS) were the primary components of AFFF (along with a number of other PFAS).

In 2019, Starkweather Creek contained higher levels of PFOA and PFOS than any other waters the [WDNR had tested](#) that year. At the creek's Fair Oaks Avenue crossing, the WDNR detected levels of PFOS at 270 parts per trillion and PFOA at 43 ppt ([Wisconsin Watch 10-2-21](#)). These levels considerably exceeded the [state Department of Health Services groundwater enforcement standards](#) of 20 ppt for PFOS and PFOA in groundwater established at that time, and there was no surface water standard yet established.

On [October 7, 2019 WDNR sent a letter](#) to Dane County Regional Airport, Wisconsin National Guard and the City of Madison naming them as the parties responsible for investigating and remediating PFAS contamination found in Starkweather Creek.

The Wisconsin Department of Health Services sent a [letter to the DNR on Oct. 4, 2019](#), assessing the health risks of PFAS in surface waters in the Starkweather Creek area, and has made the following recommendations in order to best protect people and pets from potential PFAS exposure in Starkweather Creek:

- Avoid drinking or accidentally swallowing the water.
- Wash your hands after wading or playing in the water.
- Rinse pets after contact with water to avoid swallowing PFAS that may be on their fur.

In 2020 Public Health Madison and Dane County posted signs along the Creek with the above warnings in English, Spanish and Hmong.

[WDNR also sampled fish in Starkweather Creek](#) for levels of PFAS in 2019 and found the fish contained 33,000 to 180,000ppt of PFOS. In 2020 WDNR placed Starkweather Creek under a special fish consumption advisory for high levels of PFOS in fish tissue. Sampling performed by [WDNR from 2021 to 2023](#) continued to reveal very high levels of these substances.

In January 2023 WDNR [posted fish consumption advisory signs](#) advising limited fish consumption in Wingra Creek, Lake Monona, Starkweather Creek, Lake Waubesa, Upper and Lower Mud Lake, Lake Kegonsa and the Yahara River downstream to the Rock River in Rock County.



PFAS Warning signs are posted along Starkweather Creek and downstream Lakes Monona, Waubesa and Kegonsa.

Since 1998 [Starkweather Creek has been on the WDNR Impaired Waters List](#) for poor water quality factors (Biological Oxygen Demand, Low Dissolved Oxygen, sediment, degraded habitat, unspecified metals causing toxicity and elevated chloride). WDNR added PFOS to this list of impairments in 2024.

[Dane County Regional Airport](#) recently completed a stormwater drain lining project to hopefully reduce PFAS releases from stormwater outfalls to Starkweather Creek. Results (see [WDNR BRRTS case 02-13-584472](#)) showed “mixed outcomes, with PFAS concentrations varying across locations and dates. While some areas saw reductions, others showed little change or increases, highlighting the complexity of the issue and providing valuable insights for ongoing investigations and future mitigation efforts.” The [2/25/24 report by Mead & Hunt](#) showed seven outfalls releasing PFOS from 25 to 14,000ppt and PFOA from 6 to 450ppt in .

On [November 25, 2024](#), [Dane Co Executive](#) approved a [\\$1.5million contract with Orin Technologies LLC](#) to remediate PFAS in the former Airport fire training area near Darwin Rd. This new technology utilizes Bioavailable Absorbent(BAM) augmented with microbes and electrochemical oxidation to enhance destruction of some PFAS. A pilot program using this method has shown some success (see [WDNR BRRTS case 02-13-583366](#)).

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## State and Federal PFAS Water Standards

Since 2019 the [Wisconsin Department of Natural Resources](#) has been developing standards to limit levels of two PFAS in the surface waters of the State. [These standards](#) were approved on March 2, 2022. They provide numeric surface water criteria for just two PFAS chemicals under ss. NR 105.04(4m) and 102.04, Wis. Adm. Code:

- *For PFOS, the proposed level of public health significance is 8 ng/L for all waters except those that cannot naturally support fish and do not have downstream waters that support fish.*
- *For PFOA, the proposed levels of public health significance are 20 ng/L in waters classified as public water supplies under ch. NR 104, Wis. Adm. Code, and 95 ng/L for other surface waters.*

In summary, for the surface waters sampled in this project, this ruling **limits levels of PFOS to 8 ng/L** (which is also parts per trillion, or PPT) **and PFOA to 95 ppt** (none serve as public water supplies). No other PFAS are regulated for the surface waters of Wisconsin. The US EPA recently recommended [chronic criteria levels for protecting freshwater aquatic life](#) of 250ppt for PFOS and 100,000ppt for PFOA for a 4-day average, not to be exceeded more than once in 3 years.

In 2019 the [Wisconsin Department of Health Services](#) recommended groundwater Enforcement Standard (ES) and Preventive Action Limit (PAL) for both PFOA and PFOS are 20 ng/L and 2 ng/L, respectively. For comparison, the US EPA recently passed [PFAS limits for drinking water](#) – basically 4 ppt for PFAS and PFOS, 10 ppt for PfhxS, HFPO-DA (Gen X) and PFNA, and a Hazard Index that limits water containing two or more of PfhxS, PFNA, HFPO-DA, and PFBS. In Wisconsin, the [current standard of 70ppt](#) for PFOS and PFOA in public drinking water (individually or combined) remains in effect until the DNR completes rulemaking to adopt the new EPA standards.

## **SAMPLING RESULTS and ANALYSIS**

See [complete sampling results and locations here](#).

### **Sampling Story**

In March 2024 the [East Madison Community Center](#) contacted Friends of Starkweather Creek. They were conducting educational sessions to inform locals about the PFAS issue in nearby Starkweather Creek. The national Sierra Club had contacted them asking if they were interested in sampling the Creek and other local waters for current PFAS levels, as part of their efforts to identify PFAS contamination nationally. FSC then worked with the Sierra to select sampling

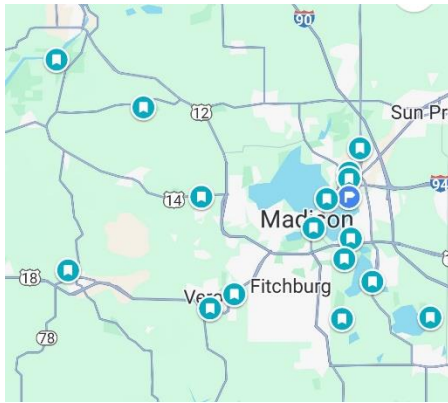


locations and to obtain [PFAS sample kits](#) from [Cyclopure, Inc](#) (710 Clark St, Suite 350, Evanston, IL 60201). Cyclopure tests for 55 PFAS analytes and measure and quantify PFAS to a reporting limit of 1.0 ppt (1 ng/L). The test kits provide a convenient, affordable and accurate way to detect PFAS compounds by simply passing the water sample through a DEXSORB loaded extraction disc, followed by recovery and analysis at Cyclopure labs.

### **Cyclopure PFAS Sampling Kit**

### **Sampling Process and Results**

From 7/26/24 to 8/23/24, volunteers visited each of the 20 selected sites to obtain samples of surface waters using the protocols provided by Cyclopure and Sierra Club and returned samplers to Cyclopure for analysis. Our first concern was determining PFS levels in Starkweather Creek above and below DCRA and in the downstream Yahara lakes. Secondly, we sampled the two outfalls of Madison Metropolitan Sewer District. And finally, we sampled several Dane Co streams and lakes to illustrate more “background” levels.



## PFAS Sampling sites in Dane Co

### 1. Starkweather Creek/Yahara Lakes Results

A total of 12 samples were taken to survey portions of Starkweather Creek above and below the Airport and in the four Yahara System Lakes – Mendota, Monona, Waubesa, Kegonsa.

Samples S1 and S2 shown below reveal very low PFAS levels in Lake Mendota and Starkweather’s East Branch, well below state standards.

The West Branch of Starkweather is fairly complex, with several tributaries which pass through and around Dane Co Airport. Sample S3 shows fairly low levels right above the airport near Stoughton Rd, with PFOS just above the state standard.

Sample S4, which was taken where two branches meet just below the Airport at Anderson St, showed **extremely elevated levels of PFAS**, by far the highest in this study. Levels of **PFOS was about 245 times** the level set in the state standards and **PFOA was over 2 times the standards**.

Further sampling downstream in the West Branch (sites S5,S7) showed PFAS levels lowering as we proceed downstream, but still well above standards for PFOS. A sample (site S6) taken in the “Golf Course Ditch” about 50 yards above where it flows into the West Branch below the Airport showed levels of PFOS slightly above state standards. The sample taken in Starkweather Creek after the East and West branches converge and before it empties into Lake Monona (site S8) reveals continuing high levels of PFOS, well above the state standard.

Two samples were collected from Lake Monona: the Brittingham Bay Beach (site S9) showed PFOS just below the standard and near the outflow of Lake Monona (S10) just above the standard.

Samples from the downstream Lakes Waubesa and Kegonsa (sites S11, S12) showed fairly similar results, with PFOS levels slightly above state standards.

**Table 1. Starkweather Creek/Yahara Lakes Results\***

Sample Site #	Site Description	Total PFAS	PFOS	PFOA	PFHxS	FHxSA	PFHxA	PFBS
S1	Lake Mendota at Tenney Park Beach	1	BRL	BRL	BRL	BRL	BRL	BRL
S2	St. Creek, E Branch, OB Sherry Park	16	4	2	3	ND	1	3
S3	S. Creek, W Branch Above Airport	19	10	ND	5	ND	1	1
S4	St. Creek, Anderson Street below Airport	5527	1961	200	1383	721	150	95

S5	St. Creek, W Branch below airport above golf course ditch	839	324	32	195	111	22	15
S6	St. Creek, Golf Course Ditch	35	11	4	7	4	2	2
S7	St. Creek, W Branch, Milwaukee St	760	368	26	153	81	17	12
S8	St. Creek before enters Lake Monona, Olbrich boat launch	331	148	12	78	35	8	7
S9	Lake Monona, Brittingham Beach	18	6	2	4	1	1	3
S10	Lake Monona entering Yahara River, Graham Park	21	9.0	2	6	2	BRL	2
S11	Lake Waubessa, Babcock Park Boat Launch	24	11	2	6	2	1	2
S12	Lake Kegonsa, State Park Boat Ramp	19	9	12	5	BRL	1	2

\* Levels of total PFAS and listed PFAS in Parts Per Trillion (ppt) for selected compounds, rounded to nearest whole number. Note – Samples showing levels above state surface water standards for PFOS (8ppt) and PFOA (95ppt) are highlighted in yellow. BRL is Below Reporting Limit (1 ppt).

## 2. Madison Metropolitan Sewage District Outfall Results

We collected samples just below each of the two outfalls of water treated at MMSD. One outfall emerges near County Highway B and Southview Rd and usually provides 40million gallons of water each day to Badfish Creek (Site S13). This sample showed PFOS and PFAS levels below state standards.

The other outfall flows into Badger Mill Creek in Verona near Hwy 151 and the Military Ridge State Bike Trail (Site S14) and also measured below state standards for PFOS and PFAS.

**Table 2. Madison Metropolitan Sewage District Outfalls\***

Sample Site #	Site Description	Total PFAS	PFOS	PFOA	PFHxS	FHxSA	PFHxA	PFBS
S13	MMSD Outfall, Badfish Creek	30	7	5	5	BRL	6	2
S14	MMSD Outfall, Badger Mill Creek	18	5	3	4	BRL	4	2

\* Levels of total PFAS and listed PFAS in Parts Per Trillion (ppt) for selected compounds, rounded to nearest whole number. Note – Samples showing levels above state surface water standards for PFOS (8ppt) and PFOA (95ppt) are highlighted in yellow. BRL is Below Reporting Limit (1 ppt).

### 3. Other Dane Co Waters

Six samples were collected from a variety of other water bodies in Dane Co to illustrate “background” levels and show any possible PFAS contamination. All samples showed levels of PFOS and PFOA below state standards.

**Table 3. Other Dane Co Waters**

Sample Site #	Site Description	Total PFAS	PFOS	PFOA	PFHxS	FHxSA	PFHxA	PFBS
S15	Wisconsin River, Mazomanie Boat Landing	9	3	2	1	BRL	BRL	1
S16	Nine Springs Creek	7	1	2	1	BRL	BRL	2
S17	Black Earth Creek along Highway 14	4	2	1	1	BRL	BRL	BRL
S18	Fireman's Park Beach	6	BRL	BRL	2	BRL	1	3
S19	Stewart Lake Beach	1	1	BRL	BRL	BRL	BRL	BRL
S20	Indian Lake	BRL	BRL	BRL	BRL	BRL	BRL	BRL

\*Levels of total PFAS and listed PFAS in Parts Per Trillion (ppt) for selected compounds, rounded to nearest whole number. Note – Samples showing levels above state surface water standards for PFOS (8ppt) and PFOA (95ppt) are highlighted in yellow. BRL is Below Reporting Limit (1 ppt).

See [complete sampling results and locations here](#).

### CONCLUSIONS

This very limited study showed continued presence of high levels of PFAS in the West branch of Starkweather creek below Dane Co Airport and fairly consistent levels above state standards in the Yahara Lakes below the creek, caused by continuous PFAS releases from the Airport grounds.

Our organization calls on Dane County, City of Madison and Wisconsin Air National Guard to immediately take effective actions to reduce and eliminate the sources of these PFAS releases.

We also call for regular monitoring of PFAS in these and other Dane Co waters to enable scientific analysis and public awareness of the hazards provided by these toxic chemicals.

**Prepared by Lance Green, Co-Chair  
Friends of Starkweather Creek**

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### Acknowledgements

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Sierra Club, Wisconsin Chapter - Jadine Sonada, Campaign Coordinator  
Cyclopure Inc - Katie Casou, Vice President, Marketing  
Sampling volunteers: Lance Green, Param Bhandare, Noah Edelstein, Mo Oberman.

## References

[Friends of Starkweather Creek](#)

[Starkweather Creek Impaired Water by WDNR](#)

[Sierra Club PFAS Program](#) , [Sierra Club PFAS Fact Sheet](#)

[Cyclopure, Inc.](#), 710 Clark St, Suite 350, Evanston, IL 60201, [Cyclopure PFAS Test kits](#)

[Wisconsin DNR PFAS Information](#)

[WDNR Bureau for Remediation and Redevelopment Tracking System \(BRRTS\)](#)

[WDNR - BRRTS Case 584472, Activity 02-13-584472 DANE CNTY REGIONAL AIRPORT, STARKCREEK SAMPLING SUMMARY FOR PFAS - DANE COUNTY AIRPORT 2-12-24](#)

[Dane Co Regional Airport, PFAS Information](#)

[Wisconsin Department of Health Services, PFAS Health Impacts Information](#) –

[US EPA PFAS Information](#)

[Agency for Toxic Substances and Disease Registry: PFAS and Their Health Effects](#)



Param Bhandare, Noah Edelstein and Lance Green shown collecting PFAS samples.